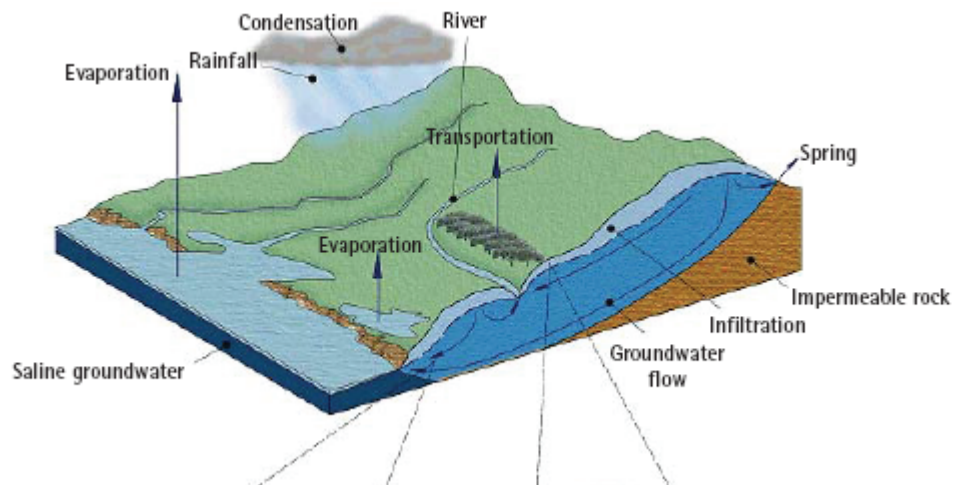


CLARK FORK RIVER BASIN GROUNDWATER POLICY

Conference Summary

University of Montana, Missoula

November 9, 2006



Co-convened by:

Clark Fork River Basin Task Force

Department of Geography, University of Montana

Montana Department of Natural Resources and Conservation

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INTRODUCTION

The Clark Fork Task Force was statutorily created to develop and implement a water management plan for the Clark Fork River basin in Montana. Such a plan must consider groundwater, which is increasingly important as a source for new water uses in the basin. In its deliberations, the task force recognized that water users, government officials, researchers, and other people could benefit from an opportunity to exchange information and share their concerns about the basin’s groundwater, its management, and relevant public policies.

The task force and other conference sponsors organized a Groundwater Policy Conference November 9, 2006, at the University of Montana, Missoula, to address the following goals:

- Examine the basin’s demographic and economic trends and how they may affect water use.
- Identify current and future water supply demands, concerns, challenges, and alternatives.
- Discuss policy and administrative tools for allocating groundwater while protecting surface water resources.

This report summarizes the presentations and discussions that took place at the conference.

REVIEW OF DEMOGRAPHIC AND ECONOMIC TRENDS

Dr. Larry Swanson, director of the O’Connor Center for the Rocky Mountain West, began the conference by providing a detailed review of trends shaping water use in the Clark Fork basin.¹ Dr. Swanson said that the Rocky Mountain West is becoming known as the country’s “third coast” thanks to a continuing period of population gains and economic diversification and growth that equals or exceeds growth on the East and West coasts. Natural amenities such as national parks and forests, accessible public lands, and the scenery and recreation they afford are “magnets for growth,” especially among the baby boomer generation. And when boomers move into a region, they create an “echo”—a bulge in population for the age groups that include their children. From 1990 to 2000, the region’s growth rates were double the national average for population, employment, and total personal income.

¹ Dr. Swanson’s PowerPoint presentation is available online at http://dnrc.mt.gov/wrd/water_mgmt/clarkforkbasin_taskforce/policy_conf_powerpoints.asp.

Montana's western third—including the Clark Fork basin—shares most of the third coast's trends. Today, more than 330,000 people live in the 11 counties bounded by the Clark Fork basin. Growth will likely continue to concentrate in counties near large and medium sized trade centers such as Missoula and Kalispell, and along major transportation corridors, but natural and lifestyle amenities, such as open space and recreational access, will be the primary determining factors for the geographic distribution of growth. In the old economy, people followed jobs, but now jobs follow people, and people are freer to live where they want. Missoula, Flathead, and Ravalli counties will continue to outpace other counties in population gains. Actual growth rates will slow during the coming decades, and will likely fall below the national average by 2020. At the same time, the population is aging, and Montana will become 4th “oldest” state in the nation by 2020.

The basin's economies are also changing as lands continue to be taken out of agricultural and timber production for residential and commercial development. Economic growth will continue in the health and business service, retail trade, and finance and real estate sectors, while manufacturing and construction will likely flatten out in coming decades. These shifts are changing water use patterns, and will markedly influence market prices for land and water alike in coming years.

GROUNDWATER POLICY “FOLLIES”

Robert Glennon, author of *Water Follies: Groundwater Pumping and the Fate of America's Fresh Waters* (Island Press, 2002), described several case histories of groundwater management gone awry.² The legal disconnect between groundwater use and its impacts on surface waters, Glennon said, hinges on allocating groundwater based on the outdated concept of “reasonable use.” In many places, state laws (or the lack thereof) allow groundwater users to pump as much water as they can use, without limit, and any use is considered “beneficial.” When the legal system does not concern itself with the possible or actual connectivity between groundwater and surface water supplies, he said, managers continue to grant well permits even and perhaps especially when surface supplies are already over allocated.

Increasingly, particularly in the arid West, water users are turning to groundwater sources. Some aquifers, such as the Ogallala beneath the Great Plains, are being pumped faster than they can recharge. Glennon cited several severe cases of draw down, surface water depletion, and ground subsidence. He also noted that high-value uses, such as municipal drinking supplies and commercial water bottlers, are now entering the water market, often willing to far outbid the relatively low prices that agricultural users have been paying. In Arizona, for example, irrigators below Grand Canyon National Park were paying \$15 an acre-foot for Colorado River water. A developer calculated that the same water would be a bargain if he pumped it up to the plateau, transported it a hundred miles by rail, and built a 50-mile pipeline to carry the water to the town of Tusayan at the south entrance to the national park. The water would allow him to develop new commercial and residential properties in Tusayan. And even though it would cost him a total of \$20,000 an acre-foot to get the water to Tusayan, that's still only *6 cents a gallon*—cheap, as municipal water rates go.

² Professor Glennon's PowerPoint presentation is available at http://dnrc.mt.gov/wrd/water_mgmt/clarkforkbasin_taskforce/policy_conf_powerpoints.asp

Glennon's reasoning leads him to propose four critical changes to our existing water management practices:

- Draft new laws recognizing groundwater/surface water connectivity.
- Create incentives to reallocate water from low-value uses to higher value uses.
- Stop letting newcomers make matters worse.
- Raise water rates. Today, most water users pay only for the costs of service—for the infrastructure and labor that delivers water to our taps. Despite what your bill might say, there is no commodity charge for the water itself. In most communities, we pay more for cable TV and telephone service.

Glennon pointed out that agricultural users typically can't afford the efficiency improvements that would free up water for other uses. He suggested that new developers should pay for those improvements as a cost of doing business (and of obtaining water for the new homes and businesses). The "hammer" of the Endangered Species Act serves a similar purpose by creating a market process that sets a value for instream flows to protect habitat and aquatic species. He also said that states should expedite adjudication processes because unadjudicated claims drive up transaction costs and the risks associated with transfers of rights.

WATER SUPPLY PANEL 1 – ELECTED OFFICIALS

The day's first panel discussion featured three elected officials representing local governments within the basin. Each reflected on his experience with water supply issues within the Clark Fork basin.

Louis LaRock, mayor of Thompson Falls, described water supply issues not uncommon in the basin's smaller towns. The story LaRock told reveals a shift toward reliance on groundwater for municipalities that have previously gotten by using surface water sources. LaRock said that until the winter of 1996-1997, the town of Thompson Falls relied on surface water from Ashley Creek for its municipal use. LaRock said the creek provided a "fairly unlimited supply; all we had to do was chlorinate it." But he also noted that the delivery system suffered about 80 percent wastage from leaks, most of which went into the groundwater.

In the spring of 1997, an avalanche occurred in Ashley Creek, leading to high turbidity. In response, the Department of Environmental Quality revoked the town's surface water exemption and recommended installing a slow sand filter. But an engineering consultant suggested developing six springs that feed Ashley Creek, and installing a gravity-feed line to Thompson Falls. The consultant's study was the first to examine the Thompson Falls water system's actual use and waste. The town followed the engineer's recommendation, and transferred existing water rights to the new source. The springs alone now supply municipal uses for nine months of the year, with supplemental water from two wells in the summer when lawn watering increases demand.

Ron Buentemeier serves on the Flathead County Conservation District and is the vice president and general manager of the F.H. Stoltz Land and Lumber Company. He cited several concerns about the basin's water supply, including downstream hydropower water rights, growth, and shifts in timber management.

In 1999, the Racicot administration successfully sought legislation to close temporarily the Clark Fork River basin to protect Avista's water rights during the Federal Energy Regulatory Commission re-licensing process for Noxon Dam on the Clark Fork River. Although an agreement was reached between Avista and the state, FERC refused to incorporate it into the Noxon Dam license. In response, the Racicot Administration, at the request of upper Clark Fork River basin water users, drafted legislation to create the Clark Fork River Basin Task Force. The task force was charged with writing a basin water management plan that would identify options to protect the security of water rights and provide for the development and conservation of water in the future. Representative Verdell Jackson sponsored the bill, which passed in 2001.

Buentemeier said that one problem with managing basin water supplies is that water right recordkeeping in general has been poor. Another issue is growth. Flathead County has grown from a population of 60,000 people in 1990, he said, to a projected 86,000 in 2007. This growth, Buentemeier said, is impacting water supplies, in part because more water is going to recreation uses such as golf courses and fisheries.

Buentemeier also suggested that timber management trends are also affecting water supplies. He likened trees to "pumps that take water out of the ground." To grow one pound of lumber, he said, requires 10,843 gallons of water. He also noted that the typical family of four uses 110,000 gallons a year. Buentemeier said that timber companies don't receive any revenue for practices that improve water production on their lands. Most companies, he said, don't own large enough tracts in any one watershed to capture a market for water production through their vegetation management practices. But timber companies are subject to regulations and restrictions that impact their operations and economic viability. He said he's not against planning, but large landowners should be part of any planning process to make sure their interests aren't inadvertently harmed. Buentemeier closed by predicting that water will be the most limiting factor in the development of western Montana.

Paddy Trussler, chair of the Lake County Commission, said that in his county, "We don't know what our water problems are—none have shown up yet." Trussler did mention the ongoing negotiations over water rights adjudication and quantification with the Confederated Salish and Kootenai Tribes (CSKT). He said that the process was slow but constructive, and that all parties may be able to agree to a compact without resorting to litigation. CSKT's status as an authority for water quality under the Environmental Protection Agency has also been advantageous.

Trussler said the biggest challenge Lake County currently faces is the need to educate the public so they can prevent problems before they occur. He said they need to start a conversation about what problems might exist now, what problems are coming in the next 50 years, and what can people do to address them.

Trussler said that regulatory changes can help improve water management, but he stressed that this wasn't the only option. He suggested land use planning and the use of conservation easements and transfers of development rights as ways to prevent development in areas with vulnerable water supplies. Lake County undertook a county-wide zoning effort. They looked

at groundwater deficiencies and where recharge comes from, and based zoning for dwelling densities on that. They also relied on existing neighborhood plans and work already completed within seven existing zoning districts. Trussler characterized the process as an 18-month ordeal, but noted the county was sued only once. The zoning codes and density map are now considered a great success because they provide incentives to develop areas where infrastructure is already in place, rather than outlying, unserved areas. Developers appreciate the enhanced certainty of knowing where to build and what the criteria are. Development has not slowed since zoning was implemented, and the value of land per acre has continued to increase.

Rather than create blanket, state-wide programs, Trussler said that we need to target such solutions to the particular needs of Montana's distinct regions and let local grassroots support drive the process. Lake County has generated some grassroots support by conducting a long-term public education campaign on water quality, quantity, dependability, and delivery of services. Trussler said that residents now have a better appreciation of the advantages of higher-density development and see water as a vital resource, central to their quality of life. He emphasized the need to meet people face-to-face and provide feedback to them so they could see that their concerns were heard and their input influenced planning and decision making. Trussler also said that newcomers to Montana are often leaving behind water quality problems in other parts of the country. They want to protect the higher quality environment they've found in Montana, and so are more supportive of planning.

With the help of the county's zoning and density maps, developers are more often trying to hook into existing municipal supply and treatment systems. This is far better than seeing dispersed, individual wells and septic sprouting wide and far, but new development could eventually overwhelm existing treatment facilities. Trussler also offered a reminder that all runoff leads to Flathead Lake. Water quality in the lake is being monitored under a Total Maximum Daily Load (TMDL) program, but contaminants cannot be quantified down to individual sources.

WATER SUPPLY PANEL 2 – PLANNERS

The second panel discussion of the conference focused on planners' perspectives. Participants were asked to respond to two questions: (1) what planning issues are you facing? and (2) what planning activities are you undertaking to meet future demands?

Dan Miles from Sanders County said that the residents in his area are of an independent mind set, and planning is fairly limited. The county employs one planner and one sanitarian. Not long ago, voters rescinded the county planning board.

Nevertheless, they have completed a comprehensive map with addresses for the entire county and done some growth planning. "It's good to be able to show people that growth has occurred," Miles said. In fact, Sanders County is the "poster child" for demographic trends typical of western Montana. People are moving to Sanders from Kalispell and the Flathead to take advantage of the lower land prices. Many are building seasonal or second homes. County development trends are also influenced by growth in Sandpoint and Coeur D'Alene, Idaho, and Spokane, Washington. Most of the newcomers are looking for wide open spaces, so development is scattered. Also, it takes extra time to usher community water

systems through the permitting process, so most applications are for individual septic systems. Thompson Falls, however, has seen a few higher density developments.

Miles said that old lot size standards have left the county with clusters of old, failing septic systems, threatening surface and groundwater resources. “We should be sewerage,” Miles said, “but money is hard to come by.”

Miles said he sees a gradual shift in awareness among county residents. “As proposals for 40-lot and 80-lot subdivisions become more common, long-time residents are starting to see the value in planning.” He also said that people moving in from areas that were more highly regulated tend to resist regulations in their new communities, but they also worry about potential aesthetic problems and lower land values if there are no controls on what their neighbors can do.

Miles said that the primary tool planners need is better water quality and availability information to help guide people on where and where not to develop.

Theresa Blazicevich, director of Ravalli County Environmental Health, described her county’s environmental health needs assessment, completed in 2004.³ The assessment identified groundwater quality as the number one problem. In response, Blazicevich said she’d like to create a local water quality district and do more to educate citizens about threats to groundwater quality and what they can do to protect the resource. She said a district would foster local participation and decision-making. As well density increases in the Bitterroot Valley, such efforts will only become more critical.

Ravalli County’s well permitting program monitors well locations, density, flow rates, and use. The program emphasizes education over regulation. The idea was pitched to drillers and well permittees as a way to help them avoid drilling in places that would lead to problems, not as another layer of rules and enforcement.

Blazicevich would like to see more regulatory authority over wells to protect public health, preferably under the Board of Health rules. She said there’s also a big gap in state regulations governing wells and individual sewer systems. She called for a state program to issue rights for all individual wells.

Blazicevich also said water planners need better information management. In particular, she said it would help to know the carrying capacity of an aquifer, though questions arise as to how to measure carrying capacity, and what steps would need to be taken to protect it. She said plenty of data exists, but it is not well collated or coordinated, meaning that it is less useful than it could be.

Pat O’Herren, senior planner for Missoula County, said that his county is divided into nine planning regions to better respond to local needs and interests. However, Plum Creek Timber Company (now a land and real estate investment company, and the nation’s largest private landowner) effectively holds veto power over land use decisions because it owns

³ Blazicevich’s PowerPoint presentation is available at http://dnrc.mt.gov/wrd/water_mgmt/clarkforkbasin_taskforce/policy_conf_powerpoints.asp

such a high percentage of lands within the county. Zoning, therefore, is limited in scope. County commissioners see “emergency” zoning as the only tool they have. It’s not subject to protest, but emergency zoning is good for only 12 months (and can be extended for an additional 12 months).

O’Herren said that when asked what the county’s current and projected water supply needs are, his honest answer is “We don’t know.” He said there is no way to develop and access the necessary data to formulate an answer. And yet, he admitted, subdivisions continue to sprout around the county, drawing on groundwater supplies and loading nitrates and other pollutants into the water resources. He noted that all three test wells in the town of Seeley Lake are contaminated with coliform bacteria. Currently, the town’s water supply comes from Seeley Lake itself. As development spreads along roads and rivers, the problems will only get worse, O’Herren said.

Jon Sesso is director of planning for Butte Silver Bow local government, and also the representative for House District 76 in the Montana Legislature.⁴ He noted that Butte is different from most Montana communities in that it imports most of its water. The bulk is piped in from the Big Hole River, which is supplemented by water from the Highlands south and west of Anaconda and an area north of the Berkeley Pit.

Butte is currently updating its growth policy (last updated in 1995), and Sesso says it still serves well today. As much as Butte wants to encourage development, officials for the first time in 15 years denied a subdivision application. The proposal was for four units, but the site featured steep slopes, no soil for septic systems, and it lay beyond city services. The Montana Department of Environmental Quality (DEQ) also denied two subdivision applications for an area southeast of Butte because gravel soils there allowed no percolation lag time for septic systems. The city has considered extending sewer services, but cost forecasts so far have been prohibitive. Septic systems with advanced technology might address some of the problems, but these are expensive and most people would rather build elsewhere than bear those costs. There’s also a low public awareness of the impacts from standard septic systems—most people think they work fine.

Sesso said that improving the accessibility and formatting of soil and water data, and making it all available in one centralized system, would help planners and decision makers faced with many factors and regulations to consider, often within short deadlines.

All three panelists agreed that planners and local officials are often caught in a bind. The public wants high quality water coming out of their taps, but few people support zoning to encourage clustered, higher density development with effective waste water treatment systems. In reality, you can’t protect water quality *and* allow widespread use of septic systems.

Where growth justifies it, some counties have looked at the possibility of levying impact fees so that development covers the costs for water treatment. Most have found that it’s expensive to meet the legal requirements, and some fees require unanimous agreement. If growth continues, we can anticipate more impact fees, though on a limited basis.

⁴ Sesso’s PowerPoint presentation is available at http://dnrc.mt.gov/wrd/water_mgmt/clarkforkbasin_taskforce/policy_conf_powerpoints.asp

The state of Washington has a system for analyzing cumulative impacts on water resources. In Montana, however, panelists agreed that the playing field is tilted in favor of developers. The exemption for wells under 35 gpm is a good example of that. Yet, planning officials are required to look at each subdivision application on its own merits, and cannot consider neighboring developments. Some people say these problems won't be resolved unless legislation is enacted at the state level. But others point out that growth and development trends vary widely across the state. The last thing counties with declining populations want to see are more regulations that could hinder growth. County commissioners typically pass water issues on to DEQ. But that agency remains understaffed, and it's not equipped to address local needs and variations.

One panelist said that the non-degradation law was a step toward addressing cumulative impacts. DEQ is coming up to speed on enforcing the law, and this is beginning to curtail approvals for septic systems in more densely developed areas. Total Maximum Daily Load standards are also affecting development patterns, notably along the Bitterroot River. One panelist said that local water quality districts and watershed groups can also do a good job of monitoring and addressing cumulative impacts—that the watershed is the right level for analysis and action.

WATER SUPPLY PANEL 3 – WATER USERS

The day's third and final panel featured water users discussing water supply challenges they see in the basin.

Matt Clifford, conservation director and staff attorney for the Clark Fork Coalition, said that residential growth is the single largest issue in western Montana. The results are two-fold: we're drawing water out of our aquifers, and we're putting lower quality water back in. Clifford said that the Clean Water Act recognizes the connectivity of surface and groundwater resources, and the TMDL rules help managers focus on that connectivity. Septic systems and residential contaminants are having a significant impact on water quality, and our non-degradation laws only consider human health concerns, not surface aquatic health issues. Most standards for groundwater contaminants are in units of parts per million, while surface water standards are parts per billion. This isn't adequate for fisheries and aquatic habitat health. And, he said, we're just beginning to deal with connectivity when it comes to water quantity issues.

Clifford said that managing growth is too often viewed as a negative—limiting development. But in reality, it's preserving our quality of life. He noted that our rivers, lakes, and fisheries are a central part of what brings people to Montana. Protecting these aspects of our quality of life also protects Montana's economic engine.

Clifford also said that, despite large total discharge volumes where the Clark Fork crosses into Idaho, dewatering is a concern in some reaches and tributaries. He said the upper Clark Fork is over appropriated, and we should be doing more to protect senior water rights. Clifford said that the exemption for wells under 35 gpm means that "a lot of water use is unmanaged." We need some way to mitigate development impacts, he said, such as water banking and facilitating transfers. "Higher value uses can and will pay for the water they

need,” he said. He also noted that many of the new water uses tend to be year-round, and that old agricultural rights typically can’t be used during winter. Augmentation, or groundwater storage, can help alleviate this problem.

As general manager of the Mountain Water Company, Arvid Hiller said that it’s his job to worry about how water is used, “because everything runs downhill and ends up in one place.” That place is often the source aquifer for municipal and domestic use. “Suppliers should worry about the quality of water after it’s been used and ‘disposed’ of,” Hiller said.

The Mountain Water Company serves the Missoula area, relying on 38 wells at depths of 80 to 180 feet. In 2005, the company had 22,000 service connections; in 50 years, it anticipates having 66,000 service connections. Existing supplies, Hiller said, are double projected need in 50 years, which is about on target for meeting highest use days and fire flows.

Hiller said the company cooperates with the Missoula Water Quality District and researchers at the University of Montana to monitor aquifer conditions. He said that 80 percent of the Missoula aquifer is recharged by the Clark Fork River. “There is a direct tie,” Hiller said, “but our wells do not fall under state regulations for groundwater under direct influence of surface water.” A recent \$300,000 study on stormwater runoff found 6,000 french drains that accumulate road runoff, oil, lawn chemicals, and other pollutants. French drains allow the water to percolate directly into the soil, raising concerns about when these contaminants will begin to show up in the aquifer. Hiller said one option may be to treat runoff before it reaches the groundwater.

Glenn Oppel, government affairs director for the Montana Association of Realtors, said that quality of life here means developing water in rural areas. “We need both quantity and quality to develop homes,” he said. Most residential wells are fitted with pumps that don’t go above 15 gpm, so the impact of such wells is less than the 35 gpm exemption implies.

Oppel said he opposes legislation being proposed by DNRC to limit irrigated lawns to one-quarter acre or less. He also said that requiring augmentation isn’t an equitable solution because hiring a consultant to prove or disprove surface and groundwater connectivity is too expensive. Besides, he said, everyone says it’s obvious that the resources are connected. These issues raise concerns not just about water availability, but about protecting private property rights and individual freedoms.

Steve Hughes is a member of the Flathead Irrigation District. He said it’s time to think outside the box, and for water users in the basin to control their own destiny. He called for using the Coal Trust fun now to benefit future generations by developing water that will be lost to downstream states if Montanan’s don’t put it to use first. Hughes said rural water systems ought to be a priority.

Hughes said that costs are the biggest challenge facing agricultural water users, and water costs will only increase. “We’re lucky to have abundant water, he said, “but we may need to enhance water supplies for irrigators or risk losing it to residential developers, who can pay a higher price.” Hughes said that would be a double loss—water no longer growing food, and open space converted to housing. With that goes Montana’s rural quality of life.

GOVERNOR'S OFFICE PERSPECTIVE

Hal Harper, Governor Schweitzer's chief policy advisor, said that managing Montana's water to meet the growing diversity of needs and demands is a primary concern and focus of the current administration. He cited large subdivisions (such as the one on Rock Creek), hydropower dams, and instream uses as competitors for the same water. He also said that if Avista made a call on its water rights, it would affect more than 7,000 water rights in the basin.

Scientific advances have shown that nearly all available surface and groundwater is connected, Harper said, but our laws and policies continue to ignore this. "We need to enact legislation that addresses connectivity and groundwater appropriations in closed basins," Harper said. "We need to do a better job of protecting senior water rights by controlling groundwater extractions—the cumulative effect is killing senior rights." Several bills are in the works for the 2007 Legislative Session. One would require a permit for wells pumping greater than 35 gallons per minute (gpm), and applicants must show no connection to surface water or they'll be required to augment the affected resource. Another bill would restrict the amount of land (to under 10 acres) that could be developed by wells pumping less than 35 gpm. In either case, Harper said, he's concerned that drillers and developers will create an avalanche of projects by hurrying to get in under the deadline. Ensuring compliance will likely be difficult, said Harper, and the burden of enforcement may be borne by other water right holders, or possibly water commissioners. Either way, Harper said, "we're a long way from some sort of state water cops."

Harper said the Governor's Office is looking at buying water from Hungry Horse Reservoir to enhance water availability in the Clark Fork basin at a projected cost of \$1 to \$3 million. But he voiced concerns over how Montana can protect that water from downstream states.

Harper said a Governor's task force is also looking at river setbacks for housing to better protect riparian habitat. The Governor's Office is distributing a brochure on riparian setbacks to every county planning office in the state. "We need to change the culture," Harper said. "If Montana looks like it does now in 200 years, then we've done our job."

POLICY AND ADMINISTRATIVE TOOLS

Mike McLane, staff to the Clark Fork River Basin Task Force, described a drought response plan for the Blackfoot River that was crafted by the Blackfoot Challenge, a grassroots watershed group of landowners, recreationists, and other people who care about the Blackfoot River. During the ongoing six-year drought, some reaches in the 1.5-million acre Blackfoot watershed have lost up to 50 percent of their fisheries. The watershed is also home to bull trout, a federally listed endangered species. Irrigators struggled with uncertain water supplies. And recreationists saw the float season dwindle to a few weeks of high water in the spring. The emergency drought plan was an attempt to get beyond an ad hoc response to drought. Rather than dividing water users into winners and losers based on water right seniority, the Blackfoot plan provides a system for sharing the sacrifice when water is in short supply.

The Blackfoot plan emphasizes voluntary measures, and spreads sacrifices as equitably as possible across all users basin wide. According to DNRC data, there are 3,185 surface water rights in the basin, 65 percent of which are for irrigation. Instream flows in the Blackfoot River are protected through legislatively created Murphy rights with a priority date of January 6, 1971. There are 258 water rights in the basin that are junior to the Murphy rights. The plan also engages four federal agencies, two state agencies, several non-governmental organizations, and local citizens.

The plan is triggered when flows at Bonner fall to 700 cubic feet per second (cfs). Studies showed that flows below that level create stress for the river's fisheries. A water bank among junior and senior water users, by reach, helps make up the difference between projected summer low flows and the 700 cfs trigger flow. Higher flows mean lower water temperatures, which are better for fish. Junior users who don't participate in the voluntary measures are subject to a call by Montana Fish, Wildlife and Parks. Additional drought response measures are triggered at 600 cfs and 400 cfs, and partial or full fishing closures are enforced above certain water temperatures. Outfitters and guides limit hours of operation and numbers of floats.

The plan also helps water user anticipate trouble. Based on seasonal snowpack, precipitation patterns, and other weather and soil data, the Natural Resources Conservation Service issues flow projections, essentially forecasting when the 700 cfs trigger will occur. The drought committee meets in February each year, and if low flow conditions appear likely, media outreach begins in basin communities. Early warnings are issued in March, and by April water users are contacted to confirm their participation in the response plan.

It also includes long-term water conservation strategies, such as water leasing in critical reaches, soil moisture monitoring (to measure irrigation effectiveness), and improving the efficiency of irrigation systems. As drought conditions continue, the "emergency" plan has evolved into a long-term, low-flow plan for allocating water.

Dr. David Shively, professor of Geography at the University of Montana, closed the conference by describing a number of policy tools for improving management of surface and groundwater resources. First, he noted several key issues that emerged from this conference and the technical conference held in September 2006, including:

- Continued growth in the Clark Fork basin is changing water use patterns; trends will likely continue for the near term.
- Growth is occurring at least in part because land use controls at the county level are virtually non-existent.
- Well density mapping is a useful way to track growth and types of development.
- Growth and increased water use are affecting the interaction of surface and groundwater in the basin.
- The legislature has closed the upper Clark Fork and Bitterroot basins to new groundwater appropriations.
- It seems clear that, as new development places new demands on existing water supplies that are already fully or over-appropriated, we will need new policies to equitably manage the resource.

In response, Shively presented a continuum of water transfer mechanisms, ranging from relatively temporary lending and adjustments, to more permanent water banking, leasing, and sales. Banking, he said, lends a degree of certainty for water users, despite drought and other changes. He said that other regions of the West have put banking and transfers to good use, noting that New Mexico, for example, allows transfers of water rights among points of use (upstream and downstream) and from groundwater to surface water and vice versa. To prevent unintended effects, rules for such measures should give water users and other affected interests standing in relevant decisions. Management rules and policies, Shively said, should take precautions to prevent problems, and should remain adaptive to accommodate changing conditions, new information, etc.

Dr. Shively also suggested looking to other states for models of land use planning and management, in part as a way to curb overdevelopment of our water resources. He said that Montana counties and communities need to move beyond land use planning and take the reins to begin actively managing growth and development.

KEY GROUNDWATER POLICY THEMES

The following salient themes emerged from the presentations and discussions during the one-day conference.

- Our laws, policies, and management methods must acknowledge the connectivity of surface and groundwater resources.
- Land use planning and water management are intertwined.
- Continued growth will bring change to Montana. We can either let the change happen and live with the consequences, or manage change to protect and enhance our quality of life.
- Demands for water are diversifying. Competition will continue to increase.
- As with land, water values are increasingly shaped by market pressures. These pressures are reshaping the allocation of water away from agriculture and toward domestic, municipal, and recreational use.
- For many water users, groundwater is becoming the “preferred” water source.
- Everything runs downhill and ends up in our groundwater. Our groundwater is at risk from how we use *all* water (and land uses as well). We need to be more careful about the quality of “used” water that recharges our groundwater.
- Hydrogeologic conditions, climate, water uses, and societal needs and interests all vary from one watershed to the next. Management works best at the watershed level, through local water quality districts and watershed groups, supported by state and federal policies.